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David J. Combes

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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/563,056
Filing Date: January 03, 2006
Appellant(s): COMBES ET AL.

Stanley C. Spooner
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 06 April 2009 appealing from the Office action mailed 19 October 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is deficient. 37 CFR 41.37(c)(1)(v) requires the summary of claimed subject matter to include: for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function as permitted by 35 U.S.C. 112, sixth paragraph, must be identified

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and the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by reference characters.

The brief is deficient because Appellant has not identified the structure, material, or acts described in the specification corresponding to the combined claimed function of "mounting said supporting frame on a substrate" and "providing thermal isolation between said substrate and said supporting frame".

Appellant argues that the structure corresponding to this mean-plus-function limitation has been identified and is appealing the rejection under 35 USC 112 related to this issue.

The Examiner's response to Appellant's arguments are provided below in section (10).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,686,779	Vig	11-1997
6,236,145	Biernacki	5-2001
4,806,760	McGlade	02-1989

2002/0036265	Ishizuya	03-2002
4459042	Paros	07-1984

A. Evidence not Relied Upon

5,917,272	Clark	6-1999
6,080,988	Ishizuya	6-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Mounting means for mounting said support frame on a substrate and for providing thermal isolation between said substrate and said supporting frame does not seem to be originally disclosed. Applicant points to page 5, lines 24-28 of the original specification to support this limitation. However, this area of the specification does not support this limitation. Rather, locating the resonator element on a suspended portion of the supporting frame to provide good thermal isolation from the underlying substrate is supported. This does not support a mounting

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means nor does it support thermal isolation between the substrate and the supporting frame.

Claims 1-4, 8-14, 16-17, 19-20, and 23 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Vig, John R. (US 5,686,779), herein after referred to as Vig.

With respect to **claim 1**, Vig teaches a device for detecting infrared radiation comprising (Abstract; col. 2, lines 16-21 and 40-47):

a resonator element (1) fixably attached to a supporting frame (2) (Abstract; Fig. 4);

an electrical oscillator for driving said resonator element into resonance (col. 3, lines 21-23), wherein the supporting frame is adapted to absorb infrared radiation received by the device thereby altering a resonant property of said resonator element (col. 1, lines 15-16 and 34-36; Also, it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchison, 69 USPQ 138. (CCPA 1946)); and

mounting means for mounting said supporting frame on a substrate and for providing thermal isolation between said substrate and said supporting

frame (Fig. 4; col. 2, lines 29-33 and 66-68; col. 3, lines 1-3; col. 9, lines 4-5).

In the alternative, if it is held that Vig does not teach a separate mounting means different from the supporting frame itself for mounting said supporting frame on a substrate and for providing thermal isolation between said substrate and said supporting frame. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a separate mounting means different from the supporting frame itself for mounting said supporting frame on a substrate and for providing thermal isolation between said substrate and said supporting frame, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

With respect to **claim 2**, Vig teaches the supporting frame comprises a suspended portion spaced apart from the underlying substrate of the device, the resonator element being fixably attached to the suspended portion (Fig. 4).

With respect to **claim 3**, Vig teaches the suspended portion is spaced apart from the underlying substrate by a distance that is sufficient to form a resonant absorption structure for radiation having a wavelength within the infrared detection band of the device (Fig. 4; col. 2, lines 16-21 and 40-47).

With respect to **claim 4**, Vig teaches the suspended portion is suspended from the underlying substrate on at least one leg (Fig. 4). In the alternative, if it is held that Vig does not teach a separate leg. It would have been obvious to one of ordinary skill in the art at the time the invention was made have a separate leg, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

With respect to **claim 8**, Vig teaches a resonant frequency of the resonator element is arranged to vary when infrared radiation is absorbed by the device (Abstract; col. 1, lines 15-16 and 34-36; col. 2, lines 16-21 and 40-47).

With respect to **claim 9**, Vig teaches oscillation means to drive the resonator element into resonance (col. 3, lines 21-23).

With respect to **claim 10**, Vig teaches the oscillation means is arranged to electrostatically drive the resonator element (col. 3, lines 16-23).

With respect to **claim 11**, Vig teaches the resonator element is fixably attached to the supporting frame at two or more points (Fig. 4).

With respect to **claim 12**, Vig teaches the resonator element comprises an elongate flexible beam (Fig. 4; col. 5, lines 29-31).

With respect to **claim 13**, Vig teaches the supporting frame comprises a layer of material having an aperture defined therein (Fig. 4).

With respect to **claim 14**, Vig teaches the resonator element comprises an elongate flexible beam, said elongate flexible beam being arranged to lie across the aperture defined in the layer of material (Fig. 4; col. 5, lines 29-31).

With respect to **claim 16**, Vig teaches a plurality of detection elements, each detection element comprising a resonator element fixably attached to a supporting frame (col. 5, lines 14-25).

With respect to **claim 17**, Vig teaches each detection element has an axis of symmetry (Fig. 4).

With respect to **claim 19**, Vig teaches an array of detection elements is provided (col. 5, lines 14-25).

With respect to **claim 20**, Vig teaches the device is formed using a micro-fabrication process (col. 5, lines 25-35).

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With respect to **claim 23**, Vig teaches, or in the alternative as modified above, all of the limitations of claims 1, as explained above. Vig further teaches having an array of thermal sensors, inherently creating a thermal imaging camera (col. 5, lines 14-25). In the alternative, if it is held that Vig does not inherently teach the array of thermal sensors form a thermal imaging camera it is well known in the art to use an array of thermal sensors in a thermal imaging camera as the sensing surface. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the array of thermal sensors, as taught by Vig, in a thermal imaging camera, as is known in the art, as a person with ordinary skill has good reason to pursue the known options within his/her technical grasp.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vig as applied to claims 1-2 and 4 above, and further in view of McGlade, Stuart (US 4,806,760), hereinafter referred to as McGlade, and Biernacki, John (US 6,236,145), hereinafter referred to as Biernacki.

Vig, or in the alternative as modified above, teaches all of the limitations of claims 1-2 and 4, as explained above. Vig does not explicitly teach the at least one leg comprises conductive material arranged to provide an electrical connection between the suspended portion and the underlying substrate.

However, it is known in the art to use electrical signals as the communication signal in response to resonance as shown in McGlade (col. 2, lines 21-27). It is known in the art to have at least one leg comprising conductive material arranged to provide an

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electrical connection between the suspended portion and the underlying substrate as is shown by Biernacki (Abstract). Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to have the at least one leg, as taught by Vig, comprise conductive material arranged to provide an electrical connection between the suspended portion and the underlying substrate, as taught by Biernacki and McGlade, in order to provide a communication path for signals in response to resonance, as a person with ordinary skill has good reason to pursue the known options within his/her technical grasp.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vig as applied to claim 1 above, and further in view of Ishizuya et al. (US 2002/0036265), hereinafter referred to as Ishizuya.

Vig teaches, or in the alternative as modified above, all of the limitations of claim 1, as explained above. Vig does not explicitly teach the supporting frame comprises a layer of infrared absorbent material. However, it is a known design choice in the radiation detector art to have the support structure comprise infrared absorbent material, as shown in [0256] lines 11-12 of Ishizuya. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the supporting frame, as taught by Vig, comprise a layer of infrared absorbent material, as is known in the art and taught by Ishizuya, as a person with ordinary skill has good reason to pursue the known options within his/her technical grasp.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vig as applied to claim 1 above, and further in view of Paros, Jerome (US 4,459,042), hereinafter referred to as Paros.

Vig teaches, or in the alternative as modified above, all of the limitations of claim 1, as explained above. Vig does not explicitly teach the resonator element and the supporting frame have different coefficients of thermal expansion. However, it is known in the thermal detector art to choose the materials of the resonator and support structure such that the resonator element and the supporting frame have different coefficients of thermal expansion, as shown in col. 2, lines 48-54 of Paros. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to the resonator element and the supporting frame, as taught by Vig, have different coefficients of thermal expansion, as is known in the art and taught by Paros, as a person with ordinary skill has good reason to pursue the known options within his/her technical grasp.

Claims 15 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vig.

With respect to **claim 15**, Vig teaches, or in the alternative as modified above, all of the limitations of claim 1, as explained above. Vig does not explicitly teach at least one of the supporting frame and resonator element comprise a shape memory alloy. However, it is known in the detector art to have the resonator element comprise a shape

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memory all, for the benefit of decreasing permanent deformation and increasing the lifetime of the detector. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the resonator element, as taught by Vig, to comprise a shape memory alloy, as is known in the art, for the benefit of decreasing permanent deformation and increasing the lifetime of the detector.

With respect to **claim 21**, Vig teaches, or in the alternative as modified above, all the limitations of claim 1, as explained above. Vig does not explicitly teach including readout electronics. However, it is well known in the detector art to include readout electronics for the benefit of creating an image. Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to include readout electronics for the benefit of creating an image.

With respect to **claim 22**, Vig, as modified above, teaches all of the limitations of claim 1 and 21, as explained above, but is silent on the orientation of the readout electronics with respect to the resonator element or supporting frame. However, it is known in the art to integrate readout electronics with detectors for the benefit of increasing the resolution of the device, because the pixels are able to be more densely packed into the same area. It would have been obvious to one of ordinary skill in the art at the time the invention was made to vertically integrate for the benefit of increasing the resolution of the array.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vig as applied to claims 1 and 16 above, and further in view of McGlade (US 4,806,760).

Vig teaches, or in the alternative as modified above, all of the limitations of claims 1 and 16, as explained above. Vig does not explicitly teach each detection element is arranged to output an electrical signal that is indicative of the resonant frequency of the associated resonator element.

However, it is known in the art to use electrical signals as the communication signal in response to resonance as shown in McGlade (col. 2, lines 21-27). Also, it is known in the imaging art to have a separate signal for each detecting element for the benefit of increasing resolution.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have each detection element, as taught by Vig, is arranged to output an electrical signal that is indicative of the resonant frequency of the associated resonator element, as is known in the art and taught by McGlade, for the benefit of increasing resolution and a person with ordinary skill has good reason to pursue the known options within his/her technical grasp.

(10) Response to Argument

Appellant's arguments filed 06 April 2009 have been fully considered but they are not persuasive.

To assist in the ease of locating a response to Appellant's arguments provided in the Appeal brief, submitted 06 April 2009, the Examiner is paralleling Appellant's

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sections of arguments. At times the Examiner will refer to another section of this response to Appellant arguments, because the responses share a close similarity. This is done to keep the same parallel sections as Appellant and reduce redundancies of responses.

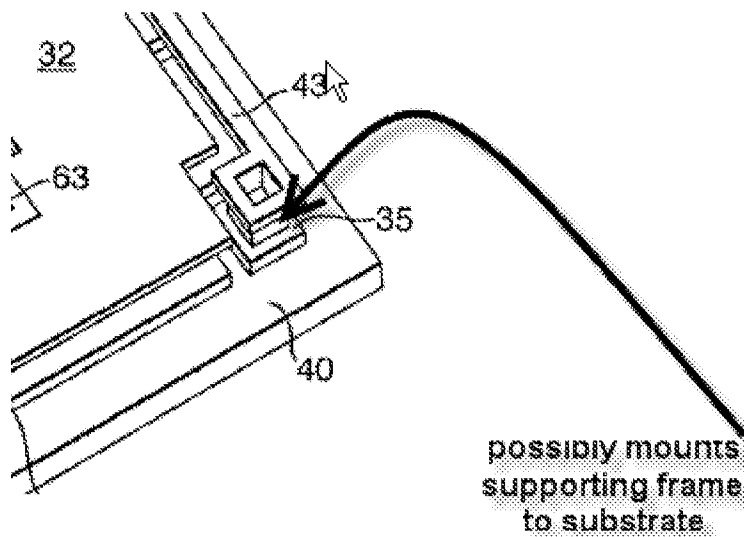
A. In response to Appellant 's arguments regarding the rejection of claims 1-23 under 35 USC 112

Appellant wishes to invoke 35 USC 112, sixth paragraph, with the limitation of "mounting means for mounting said supporting frame on a substrate and for providing thermal isolation between said substrate and said supporting frame." Invoking 35 USC 112, sixth paragraph, leads to the claim being "construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."

Appellant points to suspended portion (32) to be the claimed supporting frame and legs (43) as the claimed mounting means. While page 13, lines 4-7, in conjunction with Fig. 3, provides support for providing thermal isolation between said substrate (40) and said suspended portion (32) by having the legs (43) be long and thin; the original disclosure does not provide the legs, as Appellant argues, providing the function of mounting said supporting frame (32) on a substrate (40). There exists ambiguity of what provides the function of mounting said supporting frame on a substrate. For example, does the fixed metal layer 35 or the intermediate block, shown in annotated portion of figure 3, below provide the function of mounting said supporting frame? There does not appear to be a structure provided in the original disclosure that offers both functions of mounting said

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supporting frame on a substrate and providing thermal isolation between said substrate and said supporting frame.



(annotated portion of Appellant's Fig. 3)

B. In response to Appellant's arguments that the Examiner fails to properly construe the remaining subject matter of Appellants' claim 1.

Appellant argues that the Examiner has not properly interpreted the limitations of claim 1 (1st paragraph, page 8 of Appeal brief), namely that the mounting means mounts the supporting frame, not the resonator, on a substrate and provides thermal isolation between the substrate and the supporting frame (emphasis added). The Examiner has interpreted the mounting means mounts a supporting frame, not the resonator, on a substrate and provides thermal isolation between the substrate and the supporting frame in the prior art search and rejection made under 35 USC 102(b) or, in

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the alternative, under 35 USC 103(a). The Examiner will elaborate on the prima facie case of anticipation or obviousness in section E below.

In response to Appellants' argue against the Examiner pointing out that the "adapted to" perform a function of the claim does not provide a positive limitation, but only requires the ability to do perform function. Appellant argues that the Examiner has ignored the MPEP and its cited decisions. Appellant cites the last paragraph of MPEP 2173.05(g) to argue that "'adapted to" is a limitation which serves "to precisely define present structural attributes of interrelated components of the claimed assembly".

Appellant appears to argue that the case law cited by the Examiner is no longer valid based its age. The section of the MPEP Appellant has pointed to provides examples of whether a functional language complies with 35 USC 112, second paragraph.

Appellant's claimed "adapted to" limitation does not present an interrelationship between claimed structural elements, such as the example pointed to by Appellant. The Examiner has not rejected the claims under 35 USC 112 because of the adapted to language. Language that suggests or makes optional but does not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation (MPEP 2106 (II)(C)). Additionally, even though the Examiner has pointed out that an element being "adapted to" perform a function is not a positive limitation, the Examiner has addressed this limitation in review of prior art and the rejection of the claims. The Examiner pointed to col. 1, lines 15-16 and 34-36 of Vig in the previous Final Office Action. The Examiner would like to further point to col. 8, lines

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47-48 and 62-64, which explains that the thin film support(s) **2** may be made of an infrared absorbing material.

C. In response to Appellant's argument that the Examiner fails to understand the Vig reference

Appellant argues that Vig does not disclose that the resonator element **1** is not "fixably attached to a supporting frame," especially a frame that itself is supported on a substrate by a mounting means (2nd paragraph, page 9 of Appeal brief). While Vig does not use the phraseology of "fixably attached" one of ordinary skill would recognize that a resonating wafer **2** that is supported by thin film support(s) **2**, when the invention of Vig is taught to be produced by etching techniques (col. 3, lines 47-49), would be "fixably attached." The thin film support(s) **2** of Vig are taught to be supported, or mounted, by sandwiching the thin film supports between electrode wafers (col. 8, lines 48-49). The Examiner at this time would like to point out what appears to be a typographical that may cause confusion at some point. Vig refers to electrode wafers with reference characters 3 and 4 in col. 8, lines 49-50. However, upon reading the specification and inspecting Fig. 4 it appears that this is a typographical error and electrode wafers are reference characters 5 and 6, because these are the elements in the drawings that have electrode wafer **2** supported between them. Similarly, it appears that the top electrodes and bottom electrodes referred to with reference characters 5 and 6 in col. 8, lines 51-52 are actually elements 3 and 4 of Fig. 4.

Appellant seems to argue that item 2 of Vig does not teach a supporting frame (Appeal brief, page 9, paragraph 3). Appellant does not provide any explanation of why the thin film support **2** as shown in Fig. 4 of Vig would not be a supporting frame.

Appellant argues that the Examiner ignores the claim 1 requirement of a “mounting means” for mounting the supporting frame on a substrate or the requirement that the corresponding structure which comprises the “mounting means” also provides thermal isolation between the substrate and the supporting frame” (bridging paragraph of pages 9 and 10, Appeal brief). Similarly, to the argument of section B this will be further addressed in response to arguments of the prima facie case of anticipation or obviousness in section E below.

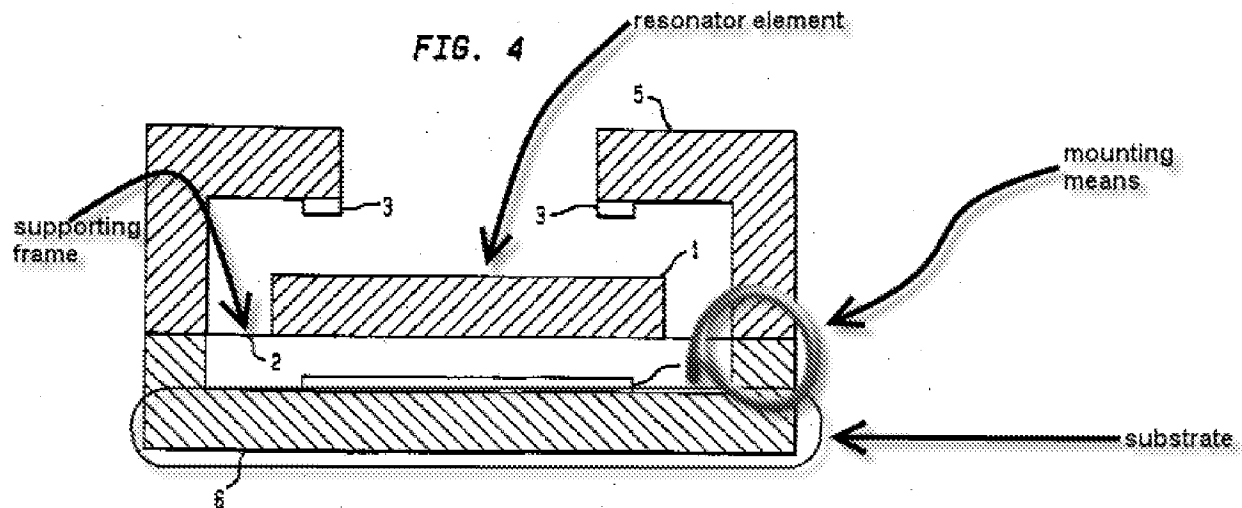
D. In response to Appellant’s arguments that the Examiner errs in failing to identify where all claimed elements are disclosed in Vig or arranged as in Vig

Appellant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

E. In respect to Appellant’s argument that the Examiner fails to set forth a prima facie case of anticipation under 35 USC 102 for claims 1-4, 8-14, 16, 17, 19, 20 and 23 or obviousness under 35 USC 103 for claims 1-4, 8-17, and 19-23 over the Vig reference

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Appellant seems to argue that Vig does not teach a mounting means for mounting said supporting frame on a substrate and for providing thermal isolation between said substrate and said supporting frame. Below, the Examiner has provided an annotated Fig. 4 of Vig to help illustrate the teachings of Vig in correspondence with Appellant's claims. Vig teaches resonator wafer 1 to be supported by thin film supports **2** (Fig. 4; col. 8, lines 47-48). Vig teaches that the thin film may be made of an infrared absorbing material (col. 8, lines 62-65). Vig teaches that the thin film support(s) or supporting frame is mounted between electrode wafers (col. 8, lines 48-49). Vig teaches that a requirement of the present invention is that the active area of the resonator must be thermally isolated (col. 8, lines 21-22). The active area would include the thin film, because it is an infrared absorbent material. Therefore, Vig teaches the active area, including the thin film, being thermally isolated. Additionally, it is known in the art that providing space between elements, such as provided between the supporting frame and the substrate (shown in Fig. 4 of Vig), provides thermal isolation.



(Annotated Fig. 4 of Vig)

If it is found that the limitations of claim 1 require that the supporting frame and mounting means be two completely different and separate elements and it is additionally found that Vig does not teach the supporting frame and mounting means be two completely different and separate elements; then as established above Vig teaches having the thin film supports **2** suspended above a substrate, wherein the thin film supports are apart of the active area of the resonator, which is required to be thermally isolated. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have two different elements rather than one element capable of performing all functions, the first element being infrared absorbent and a part of the active area of the resonator, as taught by Vig, and the second element thermally isolating and mounting the suspended portion above the substrate, as required by Vig,

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since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

Additionally, Clark et al. (US 5,917,272) demonstrates that the membrane of Vig, if held combining the features of a frame and mount in the single element of thin film support(s), can be split so its functions are accomplished by frame **28** and legs **32.1**, **32.2**.

The following art is not relied upon, but is considered pertinent to Appellant's disclosure. Ishizuya et al. (US 6,080,988) discloses a bimorph member that deflects relative to a substrate **226 and 227** supported by an absorbent material **225** mounted on an insulating leg **224** over a substrate **221**.

F-I. In response to Appellant's arguments that the Examiner fails to set forth a prima facie case of obviousness of claims 5-7 and 18

Appellant does not provide arguments for the further limitations of claims 5-7 and 18. Appellant argues that the presented references do not teach the deficiencies of Vig. The arguments against the teachings of Vig have been addressed above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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/Carolyn Igyarto/

Examiner, Art Unit 2884

Conferees:

/David P. Porta/

Supervisory Patent Examiner, Art Unit 2884

Drew A. Dunn

/Drew A. Dunn/

Supervisory Patent Examiner, Art Unit 2863